

AMENDMENTS TO THE CLAIMS

1. (Currently amended) A liquid crystal device comprising:
a substrate;
at least one photo-alignment layer applied to the substrate and which is uniformly aligned with a polarized light source;
a nematic liquid crystal layer applied to the photo-alignment layer; and
a latent image formed by the photo-alignment layer and the liquid crystal layer wherein the latent image comprises a pattern formed by image areas and/or non-image areas written or printed in the at least one photo-alignment layer and/or in the liquid crystal layer without the use of a mask, and the latent image is viewable under cross-polarizers.

2. (Currently amended) A liquid crystal device comprising:
a substrate;
at least one photo-alignment layer applied to the substrate and which is uniformly aligned with a polarized light source;
a nematic liquid crystal layer applied to the photo-alignment layer; and
a latent image viewable under cross-polarizers formed in the at least one photo-alignment layer and/or the liquid crystal layer,
wherein the latent image is formed by image areas and/or non-image areas laser written in the at least one photo-alignment layer and/or the liquid crystal layer.

3. (Canceled)

4. (Previously presented) A liquid crystal device according to Claim 2 wherein the latent image is formed by image areas and/or non-image areas of the photo-alignment layer and/or the liquid crystal layer removed by laser ablation.

5. (Previously presented) A liquid crystal device according to Claim 1 wherein the at least one photo-alignment layer is a printed layer.

6. (Previously presented) A liquid crystal device according to Claim 1 wherein the liquid crystal layer is a printed layer.

7. (Original) A liquid crystal device according to Claim 1 wherein the photo-alignment layer is printed on the substrate in the pattern forming the latent image.

8. (Previously presented) A liquid crystal device according to Claim 1 wherein the liquid crystal layer covers the substrate in the entire area of the device.

9. (Original) A liquid crystal device according to Claim 1 wherein the liquid crystal layer is printed on the photo-alignment layer in the pattern forming the latent image.

10. (Original) A liquid crystal device according to Claim 9 wherein the photo-alignment layer covers the substrate in the entire area of the device.

11. (Original) A liquid crystal device according to Claim 1 wherein a uniformly aligned first photo-alignment layer covers the substrate in the entire area of the device, the latent image is formed by a pattern in a second photo-alignment layer applied to the first photo-alignment layer, and the liquid crystal layer covers at least the second photo-alignment layer.

12. (Original) A liquid crystal device according to Claim 11 wherein the second photo-alignment layer is printed on the first photo-alignment layer in the pattern forming the latent image.

13. (Previously presented) A liquid crystal device according to Claim 11 wherein the liquid crystal layer is applied to the second photo-alignment layer in the pattern representing the latent image.

14. (Original) A liquid crystal device according to Claim 3 wherein the latent image is laser written into the at least one photo-alignment layer.

15. (Original) A liquid crystal device according to Claim 11 wherein the latent image is laser-written into the second photo-alignment layer.

16. (Original) A liquid crystal device according to Claim 3 wherein the latent image is laser written into the liquid crystal layer.

17. (Previously presented) A liquid crystal device according to Claim 1 wherein the liquid crystal layer is fixed by curing.

18. (Previously presented) A liquid crystal device according to Claim 1 which includes a coating over the liquid crystal layer.

19. (Original) A liquid crystal device according to Claim 17 wherein the coating has a refractive index which substantially matches the refractive index of the liquid crystal layer.

20. (Previously presented) A liquid crystal device according to Claim 18 wherein the coating covers the liquid crystal layer in such a manner to provide a device of substantially uniform height.

21. (Currently amended) A method of manufacturing a polarizing liquid crystal device comprising:

applying at least one photo-alignment layer to a substrate;

uniformly aligning the photo-alignment layer with a polarized light source;
applying a liquid crystal layer to the photo-alignment layer; and
forming a pattern representing a latent image in the at least one photo-alignment layer and/or the liquid crystal layer by writing or printing image areas or non-image areas in at least one of said layers without the use of a mask.

22. (Currently amended) A method according to Claim [[20]] 21 including the step of laser writing image areas and/or non-image areas in at least one of the layers.

23. (Currently amended) A method of manufacturing a liquid crystal device comprising:

applying at least one photo-alignment layer to a substrate;
uniformly polarizing the photo-alignment layer with a polarized light source;
applying a liquid crystal layer to the photo-alignment layer; and
forming a latent image in the at least one photo-alignment layer and/or the liquid crystal layer by laser writing image areas or non-image areas in at least one of said layers.

24. (Canceled)

25. (Currently amended) A method according to Claim [[24]] 23 wherein a laser is used to remove image areas or non-image areas of the at least one photo-alignment layer and/or the liquid crystal layer.

26. (Original) A method according to Claim 25, wherein the uniformly aligned photo-alignment layer is applied over the substrate in the entire area of the device, and the laser is used to ablate non-image areas of the photo-alignment layer to leave non-ablated image areas.

27. (Original) A method according to Claim 25 wherein the liquid crystal layer is applied to the non-ablated image areas of the photo-alignment layer in the pattern representing the latent image.

28. (Original) A method according to Claim 25 wherein the laser is used to ablate non-image areas of the liquid crystal layer to leave non-ablated image areas in a pattern forming the latent image.

29. (Currently amended) A method according to Claim ~~[[24]]~~ 23 wherein the uniformly aligned photo-alignment layer is applied over the substrate in the entire area of the device, and a UV laser is used to change the photo-alignment state of the photo-alignment layer in the image areas and/or non image areas.

30. (Original) A method according to Claim 29 wherein the UV laser has a wavelength of about 280 nm or less.

31. (Original) A method according to Claim 29 wherein the liquid crystal layer is applied to the photo-alignment layer in a pattern representing the latent image.

32. (Currently amended) A method according to Claim ~~[[20]]~~ 21 including the step of printing the latent image in at least one of the layers.

33. (Original) A method according to Claim 32 including the step of printing the liquid crystal layer in a pattern representing the latent image.

34. (Original) A method according to Claim 33 including the step of applying the photo-alignment layer over the substrate in the entire area of the liquid crystal device before the liquid crystal layer is applied in the pattern.

35. (Original) A method according to Claim 32 including the step of printing the photo-alignment layer on the substrate in a pattern representing the latent image.

36. (Original) A method according to Claim 35 including the step of applying the liquid crystal area over the entire area of the liquid crystal device.

37. (Currently amended) A method of manufacturing a polarizing liquid crystal device comprising:

applying a first photo-alignment area to cover the substrate over the entire area of the device;

uniformly aligning the first photo-alignment layer with polarized light;

~~applying~~ printing a second photo-alignment layer in a pattern representing the latent image;

aligning the second photo-alignment layer with polarized light at an angle different to the alignment of the first photo-alignment layer; and

applying ~~the nematic~~ a liquid crystal layer to the second alignment layer in the pattern representing the latent image.

38. (Canceled)

39. (Currently amended) A method ~~according to Claim 37~~ of manufacturing a polarizing liquid crystal device comprising:

applying a first photo-alignment layer to cover the substrate over the entire area of the device;

uniformly aligning the first photo-alignment layer with polarized light;

applying a second photo-alignment layer in a pattern representing the latent image;

aligning the second photo-alignment layer with polarized light at an angle different to the alignment of the first photo-alignment layer; and

applying a liquid crystal layer to the second alignment layer, wherein the liquid crystal layer is printed on the second photo-alignment layer in the pattern representing the latent image.

40. (Previously presented) A method according to Claim 21 wherein a variable printing process is used to print the at least one photo-alignment layer and/or the liquid crystal layer.

41. (Previously presented) A method according to Claim 21 further including the step of fixing the liquid crystal layer by a curing process.

42. (Original) A method according to Claim 41 wherein UV radiation is used to cure the liquid crystal layer.

43. (Previously presented) A method according to Claim 21 including the step of applying a coating over the liquid crystal layer.

44. (Original) A method according to Claim 43 wherein the coating has a refractive index which substantially matches the refractive index of the liquid crystal layer.

45. (Previously presented) A method according to Claim 43 wherein the coating is applied over the liquid crystal layer so as to provide a liquid crystal device of substantially uniform height.

46. (Previously presented) A polarizing liquid crystal device manufactured by the method of Claim 21.

47. (Previously presented) A security document or token incorporating a polarizing liquid crystal device in accordance with Claim 1.

48. (Original) A security document or token according to Claim 47 wherein the latent image is a portrait corresponding to the holder of the security document.

49. (Previously presented) A security document or token according to Claim 47 wherein the polarizing liquid crystal device containing the latent image is provided in a window of the security document.

50. (Previously presented) A security document or token according to Claim 47 wherein the document includes cross-polarizers in a window for verifying the latent image formed by the polarizing liquid crystal device.

51. (New) A method of manufacturing a polarizing liquid crystal device comprising:
applying at least one photo-alignment layer to a substrate;
uniformly aligning the photo-alignment layer with a polarized light source;
forming a pattern representing a latent image by printing image areas or non-image areas in the at least one photo-alignment layer using a variable printing process without the use of a mask; and
applying a liquid crystal layer to the photo-alignment layer.